IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

AMPEX CORPORATION, *Plaintiff,* v. EASTMAN KODAK COMPANY, ALTEK CORPORATION, and CHINON INDUSTRIES, INC., *Defendants.*	)	C.A. No. 04-1373 (KAJ)

DECLARATION OF ALAN CAVALLERANO IN SUPPORT OF
AMPEX CORPORATION'S CLAIM CONSTRUCTION BRIEF

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DECLARATION OF ALAN CAVALLERANO

I, Alan Cavallerano, declare as follows:

I. BACKGROUND AND EXPERIENCE

1. I understand that this Declaration is being submitted in conjunction with Plaintiff Ampex Corporation's Claim Construction Brief. Unless specifically indicated otherwise, this Declaration is made based on personal knowledge.

2. I have been engaged by Ropes & Gray LLP as a consultant and expert witness on behalf of Plaintiff, Ampex Corporation ("Ampex") in connection with this litigation. Under my consulting engagement with Ropes & Gray, I have been compensated at a rate of $150 per hour, plus reimbursement for expenses. I will receive no other compensation for my work in this litigation.

3. I have worked in the television equipment field for more than 23 years, and continue to work in fields related to television equipment.

4. I received a Masters of Science degree in Electrical Engineering from The Cooper Union School of Engineering in 1982, where my thesis was in Voice

Recognition Systems. I received my Bachelors of Science degree in Electrical Engineering, summa cum laude, from The Cooper Union School of Engineering in 1981.

5. I joined the CBS Technology Center in Stamford, Connecticut in 1982, after receiving my Masters Degree. The CBS Technology Center was the engineering research and development group for CBS Broadcasting, and I worked there for almost three years in the Advanced Television Research Department on projects relating to analog television and the early development of digital television, including high definition television. I was primarily interested in developing picture storage, processing, and improvement technologies and broadcast systems for studio and broadcast applications. I architected and designed analog and high-speed digital processing prototype systems and circuits as a means to evaluate and demonstrate the video processing algorithms and systems, typically involving a significant number of digital and analog circuit boards and racks of equipment.

6. In particular, while at CBS, I worked on a prototype "super frame store" which, at the time, was a state-of-the-art still store device that was used to capture and store high definition images.

7. Also while at CBS I was exposed to equipment typically found in a broadcast studio, including still stores, and became familiar with the operation thereof. When there was the threat of a union strike at CBS Broadcasting, I was trained on video equipment used in the studios in anticipation of having to fill-in for striking operators.

8. In 1985, I joined the Philips Research Laboratories in Briarcliff Manor, New York, as a Senior Research Associate. There I performed basic research in

the areas of video picture processing for both traditional television as well as emerging digital high-definition technology.

9. In 1986, I became a Member of the Research Staff at Philips Research Laboratories and continued my work in new video systems for high definition television that were compatible with existing broadcast television systems.

10. In 1988, I was promoted to Senior Member of the Research Staff and Project Leader and continued my work by implementing the new advanced high definition televisions in prototype development. This work included participation in the development of a new U.S. broadcast standard to be approved by the FCC for high definition television transmission.

11. I also worked in the area of display technologies, including pixilated systems such as digital micro-mirror devices and high definition LCD panels.

12. In 1993, I was promoted to Principal Member of the Research Staff and, in that capacity, was also Manager of Technical Communications. I continued to develop digital high definition television systems that were compatible with existing systems. At that time, I participated in a U.S. industry group – the "Grand Alliance" – that developed industry standards and prototypes for terrestrial broadcast of digital high definition television.

13. In 1998, I became a Project Manager for the Philips Consumer Electronics Division and was responsible for the development of digital high definition television receivers and advanced set-top box products, focusing on the video processing and high definition television signal decoding. I was involved significantly with pre- and post-processing of the video for display.

14. While a Project Manager for Philips Consumer Electronics, I functionally reported into the Architecture and Standard Design group, where I played a significant role as a system architect for the products under development. As such, I am very familiar with the hardware and software architectures of consumer electronics products. I had also been responsible for the architectures of prototype systems when I worked for Philips Research.

15. Working for a consumer electronics product division, I learned to appreciate the significance of the user interface design of the products. As the technological advances allowed for more sophisticated and useful features and functions to be made available to the end user, savvy consumers grew to expect that these functionalities and features would be provided in the products. As additional emphasis was placed on providing useful functionalities to the consumer, I became directly involved as an interface between the engineering product development and architecture teams and the marketing group, where I developed product roadmaps and developed lists of features and functions that were expected to be incorporated in the products. Considerations for user interfaces that could conveniently support these functionalities became an integral part of the initial product and engineering specifications. Such considerations were expanded to include not only the provisions for the base functionalities and required user interfaces, but also to recognize and address the significance of the response time of some of these features. For example, there were stringent specifications generated to cover the response time of a product's remote control, the amount of time permissible for a channel change in a television or set top box product, and for how quickly the on-screen display graphics responded to a user's input.

16. In 2001, I became a Project Manager at Philips Semiconductors and was responsible for data analysis related to system performance of digital high definition set-top box products and for all predevelopment projects for next-generation television products. I was also involved in the performance analysis of the digital video processor under development at the time, called the "TriMedia," for applications in products for our Philips Consumer Electronics product division, as well as for our Philips Semiconductor customers. It was crucial, for example, that our video processor could decode, process, and present for display a high definition image and, for example, a separate "picture in picture" image in real-time and within a satisfactory response time.

17. In February, 2003, I founded my own consulting firm, ACE Consulting, and have performed consulting activities in the areas of patent analysis, video product development and testing for client companies, technical writing such as product manuals and product line catalogs, and generating video technical specifications.

18. In 2003, I also became Director of Product Development at Key Digital Systems, one of my ACE Consulting clients, where I was responsible for developing and testing home theater, custom installation, and studio video scalers, switchers, and related products. I currently generate product manuals, catalogs, and production test plans for Key Digital's video processing products, and test the user interface of products before the products are released for production.

19. I have written 8 technical papers for various IEEE journals and the International Journal of Imaging Systems and Technology, and have received several awards for outstanding papers.

20. I have been listed as an inventor or co-inventor on 33 patents for my work in video technology, and have 4 patent applications currently being prosecuted.

21. I understand that Ampex, in this litigation, asserts that Kodak and the other defendants infringe U.S. Patent No. 4,821,121 ("the '121 patent"). In particular, I understand that Ampex asserts that claims 7-8 and 10-15 (the "asserted claims") are infringed. I understand that the '121 patent application was filed on April 8, 1983. Based on my review of the '121 patent and its file history, and my own knowledge and experience, I agree with what I understand to be the opinion of Dr. George Ligler, another Ampex expert in this case, to the effect that the art pertinent to the subject matter of the '121 patent is the art of digital image processing and digital television broadcasting equipment. In this declaration, I apply this definition of the pertinent art.

22. I also agree with what I understand to be the opinion of Dr. Ligler, to the effect that a person of ordinary skill in the pertinent art in 1983 was typically a person with: (i) a bachelor's degree in electrical engineering or computer science, and at least 3-4 years of design experience in the field; or, alternatively, (ii) such a person of ordinary skill would have had a master's degree in electrical engineering or computer science and at least 1-2 years of design experience in the field. In this declaration, I apply this definition of the level of skill in the art.

23. In 1983, the time of the filing date of the '121 patent, I was a person of at least ordinary skill in the pertinent art, having a master's degree in electrical engineering and at least 1-2 years of design experience in the related field.

24. I am a veteran of the video field with over 23 years of direct experience in both technical and managerial capacities. My expertise spans the video

industries for broadcasting and studios, consumer electronics, and video standards and specifications. I have designed analog and digital video circuits and systems, generated architectures for video systems and products, and have been listed as inventor or co-inventor on 33 patents all in the field of video. I founded my own consulting business where I am recognized as a video expert and have been hired by consumer electronics companies to help them architect, specify, and test their products and user interfaces; by Intellectual Property law firms to help them in their patent cases; and by firms that deal with patent analysis and review to help them rate patents in the field of video for their potential value to their client companies. For all of these reasons and more, I am well-able and well-suited to study, understand, and evaluate the issues related to this case, and render an expert opinion.

25. By virtue of my experience, I am familiar with the knowledge, experience, abilities and level of skill of persons of ordinary skill in the art as of 1983. I have gained this knowledge from working with such persons at CBS at the time, and from my subsequent research, review of the literature, discussions, consulting experience and in training and teaching others on the history of the field.

26. Additional details of my education and professional activities are attached at Exhibit A:

- A detailed summary of my Background and Experience is set forth in my curriculum vitae.
- A list of the technical papers that I have written and have been published is provided.
- A list of my patents is provided.

II. THE '121 PATENT

A. The General Field Of The Invention

27. The '121 patent is entitled "Electronic Still Store With High Speed Sorting And Method Of Operation." A still store, in 1983 was, and now is, understood by persons of ordinary skill in the art to be a device that stored still images in electronic form. As explained in the March 24, 2006 Initial Expert Report Of Richard John Taylor (the "Taylor Report"), which I understand was submitted on behalf of defendants (D.I. 233; ¶ 25), electronic still stores replaced hard copy pictures and slides. As quoted in the Taylor Report (¶ 22), the '121 patent states:

> This invention relates to a digital electronic store for broadcast television signals and more particularly to a still store providing a high speed multiimage scan or sort capability. (col. 1, lines 11-14).

28. I do not agree with the Taylor Report's suggestion that this sentence, or anything else in the '121 patent or prosecution history, limits the '121 patent to broadcast television. Although the patent discloses a specific example of the use of the invention in broadcast television, one of ordinary skill in the art, as of 1983, would have known and understood that a "a still store providing a high speed multiimage scan or sort capability" had uses outside the television broadcast context. For example, still stores were used in multimedia presentations involving closed circuit television as a replacement for slide projectors or film strip projectors. Still stores were also used in computer graphics and publishing to store and retrieve high resolution images. Still stores were used to store document image records, satellite images (*e.g.*, from weather satellites) and medical images such as X-rays. One of ordinary skill would have known that still stores had a broad range of applications when numerous digital video images had to be captured, stored and retrieved. Today's digital still cameras are miniaturized

still stores packaged within the same enclosure as the image input device, a miniaturized video camera.

B. The Problem That The '121 Invention Solved

29. The '121 invention solves a problem of still stores that others had previously tried, but failed, to solve: as more and more images were stored on a still store, it became harder to rapidly review a large library of images and select a particular image for further use. As stated in one 1980 reference describing still stores (U.S. Patent No. 4,302,776 ("the '776 patent"), which I understand is being submitted to the Court as part of the intrinsic evidence, and which is cited in column one of the '121 patent), "The contents of the disc store may hold several hundred separate pictures and the ***problem*** of examining the contents of the store in order to find a picture you need exists" ('776 patent, col. 3, lines 39-43) (emphasis added). Prior art attempted to provide solutions to the problem, such as the '776 patent and the Quantel DLS 6000 still store relied on in the Taylor Report (which is described in the '776 patent), and came up with "browse screens" that automatically displayed multiple reduced size versions of the images at the same time (*e.g.*, '776 patent, col. 3. lines 53-60, col. 4, lines 45-49, col. 12, lines 23-43, Fig. 21). These browse screens could be used to retrieve a desired full size image. However, these prior art approaches were slow to generate and display the browse screen. As described in the '121 patent (col. 1, lines 15-17, 27-43):

> Digital electronic still store video display systems store a plurality of frames of video images on relatively low cost magnetic disk storage.
>
> * * *
>
> The disk store is capable of storing a large library of single frame images and it is often desirable to generate a reduced size multiple image picture for editing or other purposes. For example, ... an editor may wish to view and compare several images at the same time for the purpose of selecting those images which will be used in a television broadcast. However, each

> of the several images which are to be simultaneously displayed must first be read from the disk store as full size images and then reduced for insertion into the multi-image display. This process takes 1/4 to 1/2 second for each image and results in a delay of several seconds for the composite multi-image display. Such a time delay is at best disconcerting for a busy editor and precludes use of the editing features of the system during a real time broadcast.

30. Thus, in the prior art systems, whenever the user called for a browse screen, the system had to retrieve from disk sixteen full size images (for example), one after the other, reduce each of them to a one-sixteenth size version (for example), and place each reduced size picture at its proper location on the screen.

31. The '121 patent came up with a better solution to generating and displaying a browse screen — rather than assembling the browse screen by "first ... read[ing] from the disk store [the] full size images," and then "reduc[ing] [the images] for insertion into the multi-image display," the '121 system automatically generates the reduced size images when it first captures and stores the full size images. The reduced size image is stored along with the full size image. Then, when the browse screen is needed (i.e., when the user commands the system to generate the browse screen), it is generated more rapidly, because the reduced size images making up the browse screen have previously been created and stored.

C. The Example Of The Invention Described In The '121 Patent

32. The '121 specification describes a specific example of how the invention works. In the Figure of the patent, all the standard components of then-existing still stores are used, but the components interact in a novel and inventive way to achieve the objectives of the invention.

1. Capturing and Storing Images

33. Like all still stores, the '121 patent discloses hardware and circuitry for capturing and storing images. First, a video input circuit (Figure, box 12) is used to capture an analog form of the image. The patent explains that this circuit "may be another electronic still store system, a TV camera, or some other source of video data from which one or more frames of a video image may be captured" ('121 patent, col. 2, line 65-col. 3, line 1). The image is converted to digital form by the Input A/D 14, and stored in the frame store 22.

34. The frame store of the '121 disclosed embodiment is arranged as a random access memory, or RAM (col. 3, lines 44-45). The frame store is used during image capture both to hold the image before it is more permanently stored, and to display the image before it is stored. To do this latter display, the image data is converted back to analog form by the Output D/A 28, processed by Output Processor 32, and displayed on a Monitor 30. In response to an appropriate command from User Console 18, the CPU (Central Processing Unit) 16 controls the system to cause the image in the frame store to be stored on the Disk Store 24. The disk store is also referred to in the patent as "bulk store" (*e.g.*, col. 3, line 51). In this manner, numerous images can be stored on the bulk store of the '121 system.

35. The above description of capturing and storing images is common to both the '121 patent and the prior art. This aspect of the prior art is described in column 1, lines 15-17, and 27-28, of the '121 patent. In addition, Figure 18 of the '776 patent, also cited in column 1 of the '121 patent, shows a video input, an "ADC" (analog to digital converter) 13, a frame store 14, and disk 18/20. (Figure 3 shows the user

console and CPU, and the patent generally describes the output circuitry and monitor, including in Figure 2).

36. However, in addition to these common, prior art features, the operation of the image capture and storage aspect of the '121 invention includes additional unique features not disclosed in the prior art. Specifically, for each image that is captured and stored, a reduced size version of that image is generated and stored along with it. The '121 patent describes a specific order of operations and interaction of components that is not present in the prior art. When the user decides to store an image in bulk store, the system automatically sends the image data from the RAM 22 to the Size Reducer 26. The size reducer reduces the image, and the reduced size version of the image is sent back to the RAM, and stored in separate locations in the RAM along with the full size image. Then both the full size image and the reduced size image are stored in bulk store. This operation is described in detail in the Abstract, at column 2, lines 1-5, 17-20, 37-43, column 3, lines 55-68, and column 4, lines 1-27.

2. Generation of Reduced Size Images Using a Size Reducer

37. In the foregoing description of the image capture and storage process of the '121 patent, a size reducer is used. The size reducer 26 itself, like the other components of the '121 patent, was well known to persons of skill in the art as of 1983, although the way that the size reducer is used in the '121 patent was new. The term "size reducer" connoted well-known structures to those of ordinary skill in the art as of 1983. The '776 patent, and U.S. Patent 4,172,264 (the '264 patent") (which I understand is also submitted with the intrinsic evidence), which were both cited in column one of the '121 patent, each describe size reducers. It is such a prior art size reducer that was used to generate the reduced size images for the prior art browse function. The disclosure of the

size reducer in the '121 patent was sufficient to enable one of ordinary skill in the art to implement that component and functionality in making and using the '121 invention.

3. Review Of Images

38. In addition to the image capture and storage mode of operation, the '121 patent also discloses modes of operation to review images. In what the patent calls a "first" or "normal" mode, the full size image could be accessed and retrieved from bulk store, placed back into RAM, and viewed on the monitor or sent for use elsewhere. This mode of operation is described at column 2, lines 5-8, 22-25, and column 4, lines 28-44. This normal mode of operation was also present in the prior art, as disclosed in the '121 patent at column 1, lines 17-21, and as also disclosed in the cited '776 patent (*e.g.*, col. 3, lines 1-10, Fig. 2).

39. The '121 patent also describes a "second, editing or browsing mode." As discussed above, the prior art also disclosed a browsing mode. However, the browsing mode of the '121 patent was different from that of the prior art — instead of generating the reduced size images from full size images each time the browse screen was needed, the '121 approach generated and stored the reduced size images just once, at the time of full size image capture. In the '121 patent, a number of these previously stored reduced size images are retrieved into the RAM 22 and displayed, for example as a 4x4 matrix of 16 images. This mode of operation is described in the abstract, and at column 1, line 64-column 2, lines 1, column 2, lines 8-16, 32-51, and column 4, lines 45-67.

40. As already discussed, the prior art method of generating the browse screen, although automatic, was slow. When the user invoked the browse function, the system automatically generated the reduced size images from the stored full

size images as the browse screen was being generated. Figure 18 of the '776 patent shows how this was done. During image capture, a number of full size images were stored on disk 18/20. When the user selected the browse function, 16 (for example) full size pictures were retrieved from disk, passed through the size reducer 23 (called "H+V Interpolate" in Fig. 18), reduced, and placed into one of the output frame stores (24, 124 or 125) for review. Gradually, the full size image comprised of the 4x4 (for example) browse screen matrix of reduced size images was created, one freshly generated reduced size image at a time.

D. The Advantages Of The '121 Invention

41. The advantage of the '121 patent over that of prior art browse screen methods is explained in the patent (Abstract; col. 1, lines 31-34; col. 1, line 64-col. 2, line 1; col. 2, lines 32-45; col. 4, lines 58-67):

> The quarter sized image can then be recalled directly for a multi-image scan or sort function in which 16 reduced size images are displayed simultaneously without the time delays associated with the retrieval and size reduction of 16 full size images.
>
> * * *
>
> [A]n editor may wish to view and compare several images at the same time for the purpose of selecting those images which will be used in a television broadcast.
>
> * * *
>
> An electronic still store system in accordance with the invention rapidly generates and outputs for display to an operator a still image frame comprising a plurality of selectively positioned, reduce size images which may be simultaneously viewed for scanning or editing purposes.
>
> * * *
>
> In operation the system can rapidly assemble an array of 16 reduced size images for output as a single image frame. A system operator may view the reduced size images simultaneously for rapid scanning of some or all of the stored images within the image store.... Because the images are read from the image store in reduced size and spatial resolution, the output image formation time is approximately the 1/4 to 1/2 second required to transfer a single full size image instead of the several

> seconds which would be required to transfer 16 full size images prior to resolution reduction and storage as a reduced size image.
>
> Using this system an operator may rapidly scan many still frame images which are stored by the image store ....
>
> * * *
>
> The 16 image assembly time is greatly reduced because only an amount of data equivalent to one full size, full spatial resolution, image need be transferred from disk store 24 to define all 16 images. This is only one-sixteenth of the time that would conventionally be required.
>
> [T]here has been shown and described above, a particular arrangement of an electronic still store system which can rapidly compose a multiple image frame of data....

42. As an end-user of consumer products such as digital still cameras, and also drawing upon my experiences of specifying and testing the user interfaces of consumer electronics products, it is my opinion that the '121 patent provided a significant advancement to the state-of-the-art. It is my opinion that the use of the invention in digital still store devices such as cameras would provide a valuable feature to the end-user and hence increase the marketability of the product, providing a one-up over competitors not employing the '121 invention. Users of consumer electronics products, such as digital still cameras, expect that those devices will have as rapid a response as possible to user controls. The average user is dissatisfied unless the pressing of a button or the like provides a response that is as fast as possible. The rapid generation of a browse screen is one such user feature. The invention of the '121 patent provides a more rapid response to the user's activation of a browse screen. If a digital still camera manufacturer were not permitted to use the '121 invention in this feature, while its competitors used the invention, that manufacturer would be at a significant marketing disadvantage.

E. Some Basic Features Of The '121 Invention

43. One of ordinary skill, reading the '121 patent, would understand that the disclosed browse mode of the '121 patent is an ***improved*** browse approach, compared to that of the prior art. Without the improvements offered by the '121 invention, the prior art browse was characterized by a slower automatic browse; a more cumbersome retrieval of full size images associated with images in the browse screen; or the necessity for the user to perform a complex series of manual operations, if available, to achieve the desired results. However, in spite of these improvements offered by the '121 invention, it follows that certain characteristics of the prior art browse feature must also be present in the '121 invention.

44. The preserved features of the prior art browse include: (i) The browse screen is automatically generated. When the user selects the browse function, the browse screen containing the 16 (for example) reduced size images is automatically generated and displayed. (ii) Using the browse function, a user was able to access the entire contents of the full size images stored on the device, by scrolling through successive browse screens. (iii) When the user uses the browse screen for its intended purpose — to locate and retrieve a full size image — there must be some relationship between each reduced size picture displayed in the browse screen and a full size picture stored in the system, so that a full size picture can be retrieved for use.

45. These attributes of the prior art browse screen are described in detail in the cited '776 patent. The patent describes a "browse facility" to "provide a matrix of miniature pictures displayed together on the screen" (col. 3, lines 53-60). The '776 patent explains that the browse screen can superimpose a "number or code" on each picture, allowing the user to select the desired picture by entering the corresponding

number via a keyboard. Alternatively, the '776 patent explains that a browse function could include the provision for the user to select the desired picture by touching the screen with a light pen. ('776 patent, col. 3, lines 53-66, col. 4, lines 45-49). The patent further states (col. 12, lines 22-37):

> It is possible to use a fixed degree of compression to generate a frame comprising a number of stored pictures to provide a browse or polyphoto facility as shown in FIG. 21. The pictures comprise a number of successive compressed images (*e.g.* 16, 25 or 36 say, as in this example) which are available for display together....
>
> The pictures displayed may follow the order actually stored on the disk or alternatively can be in the order actually accessed. The picture can be made to scroll horizontally or vertically as sequential pictures are compressed to provide visual access to the entire library of pictures stored.

46. These basic features were also present in the Quantel 6000 prior art still store device that was in wide use in the field when the '121 patent was applied for. The Quantel 6000 was disclosed (not by model number but in substance) in column one of the '121 patent, and considered by the Patent Office during the '121 prosecution. As discussed below, an article, entitled "The DLS 6000: A New Digital Still Store Library System," by Hugh Boyd (the "Boyd article"), was cited by the Examiner during the '121 prosecution and which I understand is being submitted as part of the intrinsic evidence. The article describes a browse function that automatically generates a matrix of reduced size pictures, that can be used to browse the entire contents of the still store. The article explains that the browse screen can be used to identify the full size counterpart images: "The Ident display overlays the true Picture number when using the 'browse' feature, so that the various chosen Pictures may be easily identified" (p. 48, col. 2; *see also*, AX022126).

47. Thus, one of ordinary skill in the art, reading the '121 disclosure, and being informed by the fact that the '121 approach was an improvement over the prior art browse approach, would have understood that several features of the '121 patent are required: First, the generation and storage of the reduced size image when the full size image is captured and stored occurs and must be automatic, without the user necessarily knowing or caring that it happens, let alone being required to make it happen by, for example, a manual operation or series of manual operations. Second, this automatic generation and storage of a reduced size image must occur each time a full size image is captured. Third, the browse screen must be automatically generated from the pre-stored reduced size images when the user selects that function. Fourth, there must be a "correspondence" maintained between the full size image and the reduced size image, so that the browse screen, as it is being generated, consists of the appropriate reduced size images, and so that the browse screen, once it is generated, can be used to retrieve a selected full size image. One of ordinary skill would have understood that these basic features would be included, because otherwise the '121 patent would not achieve the basic functionality of the prior art browse approaches, which would have made no sense.

48. The specific disclosure of the '121 patent further confirms these basic features of the '121 invention (Abstract; col. 1, lines 31-34; col. 1, line 64- col. 2, line 1; col. 2, lines 32-45; col. 4, lines 58-67). As discussed further below, these features are also confirmed to be part of the claimed '121 invention by the prosecution history of the '121 patent. In regard to these basic features, Ampex's Claim Construction set forth at Constructions 9-13, 18, 23, 26-28 of the Joint Claim Construction Chart (afterward

referred to as "Construction _") correctly state how one of ordinary skill in the art would construe the asserted claims.

III. THE PROSECUTION HISTORY OF THE '121 PATENT

49. I understand that the prosecution history should be considered when interpreting the claims, from the vantage point of a person skilled in the art. I am the named patentee of 37 patents and patent applications, and from that experience have some knowledge, from the viewpoint of an inventor, of patent application procedure. I discuss below aspects of the prosecution history of the '121 patent that assist me in my opinions expressed in this declaration. I understand that the pertinent portions of the prosecution history are being submitted as part of the intrinsic evidence.

A. The Boyd Article

50. In the first Office Action, mailed December 21, 1984, the Examiner cited, and attached, a copy of the Boyd article, mentioned above. The Examiner rejected pending claims 1 and 3-14 as obvious in view of this reference. The article describes the Quantel DLS 6000 series still store, which, as discussed above, was referred to (not by model number, but in substance) in column one of the '121 patent. The Boyd article does not disclose anything pertinent about the '121 invention not disclosed in column one of the '121 patent. Although the Boyd reference mentions that the DLS 6000 had a "browse" feature, it does not disclose how that feature is implemented, unlike column one of the '121 patent.

51. Just as shown in Figure 18 of the cited Taylor '776 patent (discussed above), the DLS 6000 as described in Boyd had a size reducer that was interposed between the magnetic disk store and the frame store. Although not specifically disclosed in Boyd, this is the size reducer that was used to automatically

generate the reduced size images for the browse function, as described above. When the on-the-fly browse feature was selected by the user, each full size image was successively read from magnetic store, automatically reduced, and placed in frame store. Even though this was automatic, it had the disadvantage of slower operation described previously.

B. The Examiner's Statement of Novelty

52. In the first office action, page 4, the Examiner acknowledged that the disclosed invention of the '121 patent was novel over the Quantel DLS 6000 as disclosed in the Boyd article, but he asserted that some of the claims did not clearly describe the "apparent novelties of the claimed invention." Specifically, the Examiner described the novelty of the disclosed invention as follows:

> (1) each stored "frame" of video data contains both a full and a quarter resolution copy of the image;
>
> (2) size reduction and production of the "frame" of video data is performed by the interaction between the size reducer and the frame store prior to storage in the image storage;
>
> (3) and the "frame" of video, containing both resolution copies, is non-selectively produced for all images that are stored. (emphasis in original.)

This is significant, because none of the prior art on which the Taylor Report relies embodies or discloses these novel aspects of the '121 invention.

53. I note that the Examiner used "quarter resolution copy" in this statement of novelty. However, a person skilled in the art would understand that this statement of novelty is not limited to a particular size reduction factor. When the examiner made this statement, and throughout the prosecution that led to the '121 patent, there were always dependent claims specifically limited to quarter size images, while other claims were not so limited. For example, original application claims 3 and 13 were

so limited, and the other application claims were not. One of ordinary skill would realize that the examiner was simply using "quarter resolution copy" as a proxy for "reduced resolution."

54. I also note that when the '121 patent refers to "quarter size image," this means reduction in the size of an image to one-quarter of its full size in both width and height, thus amounting to a $1/16^{th}$ size reduction in area. This is disclosed, for example, at column 3, lines 58-63.

C. The Meaning of "Frames of Video Images"

55. In the first Office Action, the Examiner also rejected the claims because he considered the phrase "frame of video images" to be indefinite. The Examiner indicated that the term could refer to a full resolution frame, a quarter resolution frame, or frames which contain both a full and quarter resolution copy.

56. In Ampex's February 4, 1985 response, Ampex clarified that "frames of video images" refer to either full resolution frames or reduced resolution frames but not the combination of the two. Taking this definition, one of ordinary skill would therefore restate the Examiner's use of "frame of video data" in the above first and second points of novelty, set forth in the first Office Action, as: "size reduction and production of the full size frame and reduced size frame of video data is performed by the interaction between the size reducer and the frame store prior to storage in image store."

D. The Discussion of the Automatic Operation of the '121 Invention During the '121 Prosecution

57. At page 11 of its January 30, 1986 Amendment, Ampex also explained its amendments to pending claims 12 and 14:

> Claims 12 and 14 have been amended such that the operation of the size reducer in producing the reduced size image data set from the

> corresponding full size image data set is "in response" to the writing of the full size image data set into the frame store. Boyd clearly does not teach this responsive use of the size reducer. To perform such an operation with the Boyd system an operator would have to orchestrate each step. Thus the applicant believes that amended Claims 12 and 14 are patentably distinguishable over the Boyd disclosure.

At page 12, in connection with another claim, Ampex repeated this argument:

> This automatic use of the size reducer is clearly not taught by the Boyd publication. Again, this type of operation would require complete operator orchestration by the Boyd publication.

58. Although claims 12 and 14 were later cancelled and new claims added, a person of ordinary skill would have understood from this argument that it applied to the phrase "in response to" or "responsive to" as to all issued claims using that phrase in the above context. Thus, phrases such as "responsive to said random access memory," would mean to one of ordinary skill that the recited operations are performed automatically under processor control, as opposed to an operator having to orchestrate each step. For these reasons, I agree that Ampex's Claim Construction at Construction 23 correctly sets forth how one of ordinary skill in the art would construe "responsive to" in the asserted claims.

59. In a May 23, 1986, Final Office Action, the Examiner withdrew the rejections based on the Boyd article, and entered rejections to the pending claims on 35 U.S.C. § 112 grounds. The Patent Examiner stated that the claims would be allowable if the Section 112 rejections were overcome. Thus, Ampex's arguments distinguishing the Boyd Article from the '121 claims prevailed.

E. Ampex's Incorporation of the Examiner's Points of Novelty into the Claims

60. At page 12 of the February 24, 1987 Preliminary Amendment, Ampex stated that the new claims 16-28 were "in accord with the novelty identified by

the Examiner" in the initial December 21, 1984 Office Action, discussed above. Ampex further stated that the claims "teach storing a reduced image with the full size image each time a full size image is to be stored from the frame buffer to the disk." At page 13, Ampex further asserted that, in contrast to the Quantel DLS 6000 reference, the claimed invention:

> has a major advantage over the Boyd, Quantel system in that access time for a frame comprised of one or more reduced images will be substantially shorter than the Boyd, Quantel system can provide. This is because the Boyd, Quantel reference does not store a reduced image automatically with the full size counterpart each time a full size image in the frame buffer is to be stored on disk. Thus to access any particular reduced image, the entire full sized image must be accessed and loaded into the size reducer.

61. Based on these statements, including the statement that the new claims were in accord with the novelty identified by the Patent Examiner in the initial December 21, 1984 Office Action, one of ordinary skill would interpret all of the issued claims as requiring that data representing the reduced size image be automatically stored each time that data representing the full size image is to be stored, and that data representing the reduced size image automatically be generated by the interaction between the size reducer and the random access memory prior to storage in the bulk memory. For these reasons, I agree that Ampex's Claim Construction at Constructions 26-28 correctly set forth how one of ordinary skill in the art would construe the asserted claims.

F. The Consideration of the '776 Patent During the '121 Prosecution

62. In a January 4, 1988 Office Action, the Examiner rejected certain claims as anticipated by the '776 patent, one of the patents disclosed in the original application. As discussed above, the '776 patent, including Figures 18 and 21, discloses

the pertinent features of the DLS 6000 that were also disclosed in column one of the '121 patent. In addition, Figure 19 of the '776 patent describes an alternative embodiment that is closer prior art to the '121 claims than the AVA, Quantel Paint Box, or Quantel DLS 6000, whether considered one at a time or taken together.

63. Figure 19, and the accompanying description, discloses a frame store (14/24) that receives a digital video image, a magnetic disk (18/20) in which an image can be stored, and a "size change" circuit (23) that is disposed between the frame store and the magnetic disk. The '776 patent discloses (column 11, lines 39-44):

> It would also be possible to provide size change prior to converter 16 as now shown in FIG. 19 by moving the position of processor 23 to provide an increase or decrease in picture size relative to normal frame size prior to storage on disk 18 should this be desired.

Thus, the system disclosed in Figure 19 of the '776 patent places the size reducer between the frame store and the disk store, and provides for a reduced size image to be generated and stored on disk. Figure 19 supports the Examiner's statement about the '776 patent, that the disk store was capable of "storing both the full size and reduced size image frame copies," (1/4/88 Office Action, p. 6). Notwithstanding this teaching of Figure 19, there is no teaching in the '776 patent that full size and corresponding reduced size images should be stored. Instead, the '776 patent teaches away from such an idea, by describing the failed "on-the-fly" and "pre-stored index" approaches for generating the browse feature (Fig, 21 and col. 12, lines 24-43).

64. Attached as Exhibit B is a block diagram architecture depicting the interconnections of the bulk store, frame store, and size reducer for each of the '776 patent Figures 18 and 19, as well as for the Figure in the '121 patent. As Exhibit B shows, one of the unique features of the '121 patent is the direct connection of the size

reducer to and from the random access memory, and the direct connection of the random access memory to and from the bulk store.

65. Attached as Exhibit C is a pictorial representation of how the '776 systems and the '121 system architectures are distinguished for images already captured and stored in the bulk store:

- For the '776 patent Figure 18, full size images are read from the bulk store, pass through the size reducer, and used to overwrite part of the full size image in the frame store.
- For the '776 patent Figure 19, images in the bulk store, which can be full size images or reduced size images, are read from the bulk store to the frame store.
- For the Figure of the '121 patent, full size images and their corresponding reduced size counterparts were generated automatically when the full size image was captured by the '121 system; and the reduced size image can be recalled to form a browse screen.

G. Ampex Distinguished the '776 Patent During the '121 Prosecution

66. Ampex's October 7, 1988 Amendment in response to a July 22, 1988 Office Action, where the Examiner had maintained the rejection of some of the claims in light of the '776 patent, successfully distinguished the '776 patent from the '121 invention. In particular, Ampex elaborated on the distinctions between the Taylor '776 patent and the inventions of issued apparatus claims 7, 8 and 10 (which were then application claims 18, 19 and 23), arguing at pages 9-12 that:

> [The claims] are not fully met by the cited reference to Taylor et al. For example, Claim 18 recites, *inter alia*, a random access memory means (frame store 22) for individually storing ... succession of full size images ... and a corresponding reduced size version thereof at said second resolution (underlining added). Taylor et al fails to describe and does not intend the storage of both a reduced size and a full size image in his frame store (14/24 or 124/125) in the manner of applicant. In fact, any size reduction, and thus reduced size image, is made on the full size image only at the time the latter is transferred from the disk storage (18/20) to the

> frame store (24/124/125) as depicted in FIG'S 5, 18 and 19, or from the frame store to the disc storage as depicted in FIG. 19. Applicant's invention on the other hand, as described and claimed, provides image reduction via his size reducer (26) coupled only to the frame store (22), and which receives the full size image only from the frame store whenever there is no reduced size image, and which then returns the reduced size image directly back to the frame store for storage thereof simultaneously with the corresponding full size image.
>
> * * *
>
> In any event, Taylor et al fails to store both the full size image and its reduced size version in his frame store as described and claimed by applicant .
>
> * * *
>
> Accordingly, Claims 18, 19 and 23 are variously amended herewith to further clarify the language thereof over the reference to Taylor et al. Claim 18 recites *inter alia*; a "random access memory means for ... storing video pixel data representing ... full size images ... and a corresponding reduced size version thereof at said second resolution"; bulk memory means which stores both size images and which transfers either size of the images directly back to the random access memory means, with no other circuit therebetween; and means for generating the reduced images from the full size images and returning both directly back to the contents of the random access memory means. Taylor et al fails to teach the above features of storing both image sizes simultaneously in the random access memory, the direct transfer of images between the disc storage and random access memory, or the transfer of images directly between the size reducer and only the random access memory.
>
> Likewise, Claims 19 and 23 also recite the above features in differing language and terms, and thus are not anticipated by Taylor et al for the same reasons given above.

67. To one of ordinary skill in the art as of 1983, the above statements by Ampex limit the issued apparatus claims 7, 8 and 10 in several respects:

- Data representing each full size image and data representing its corresponding reduced size image must be stored in random access memory simultaneously;
- Data representing a full size image, or reduced size images, must be directly transferred from the bulk memory to the random access memory without passing through the size reducer (or otherwise processed to alter the image);

- The size reducer must transfer video pixel data representing images to, and receive such data from, only the random access memory.

68. These limitations are the consequence of a fundamental difference in architectures that the October 7, 1988 Amendment discussed and used to distinguish the '121 invention over the Taylor '776 patent. For both Figures 18 and 19 of the '776 patent, the size reducer is interposed between the frame store and disk. In contrast, the '121 system has the size reducer directly connected only to the random access memory, and the random access memory connected directly to the disk. In addition, during image capture, it is only in the '121 system that the full size and corresponding reduced size image are in random access memory simultaneously.

69. In this context, Ampex used the word 'direct' or 'directly' in claims 7, 8 and 10 to distinguish the cited art in which size reduction occurs when full size images are read from disk store. Thus the claims exclude from their coverage the path disclosed in Fig. 1 between the disk store and the size reducer. Earlier in the prosecution history, a claim was drafted to specifically cover that path — but that limitation was dropped and no such claim issued. (Cf., Paper 25, p. 8, claim 20, with Paper 28, p. 9-10, claim 20).

70. For these reasons, I agree that Ampex's Claim Construction at Constructions 17, 21, and 25 correctly sets forth how one of ordinary skill in the art would construe the asserted claims.

H. The Meaning Of "Simultaneously" In Claims 13 And 15

71. Also in the July 22, 1988 Office Action, at page 2, the Examiner entered rejections under 35 U.S.C. § 112 ¶ 2, including a rejection of claim 29 (issued claim 13) because it was unclear which phrase was modified by the "simultaneously."

72. In Ampex's October 7, 1988 Amendment, in response to the Section 112 rejections, at page 8 Ampex clarified that "simultaneously" in pending claim 29 modified the set of reduced size images:

> Regarding the rejection under 35 USC 112, applicant has deleted the word "either" from Claim 29, line 13, and added a comma (,) to line 14, thereby clarifying that the accessing is done to one of the ... full size images, *or* to the reduced size reproduction images in a set simultaneously. Thus the confusion is believed removed.

73. Thus, Ampex clarified that "simultaneously" referred to the manner of accessing data for reduced size images only. Then, in a November 7, 1988 Notice of Allowability, the Examiner amended pending claim 29 to read "selectively accessing . . . a data set representing one of the plurality of full size images, and a data set representing one of the corresponding plurality of the reduced size reproduction images, simultaneously." It also included amending pending claim 31 (issued claim 15) to read "selectively accessing . . . a data set of one of the plurality of full size images, and one of the sets of the corresponding plurality of the reduced size reproduction images simultaneously." Thus, the Patent Examiner changed the "or" in these claim elements to "and," without stating any reasons for doing so.

74. Given the previous clarification of "simultaneously," and given that, according to my understanding, Examiner's Amendments are limited to routine administrative and clerical corrections, a person of ordinary skill in the art would understand that the Examiner's amendment merely clarified that the claimed system had the capability of both "accessing a full size image" *and* also of accessing a plurality of reduced size images simultaneously. Thus, a system that could only access a full size image, but not a plurality of reduced size images, would not meet this claim element.

75. For these reasons, I agree that Ampex's Claim Construction at Constructions 34-35 correctly set forth how one of ordinary skill in the art would construe "simultaneously" in claims 13 and 15.

76. I understand that the Defendants have construed the claim term "selectively generating" differently from Ampex. Taylor Report, ¶ 71 relies on a passage from the '121 patent: "...when video data pulled from the disk store 'does not contain' a corresponding reduced size image, the size reducer 'may' be employed to generate a reduced size image. *See Col. 4, ll. 7-15 [of the '121 patent]*." The Taylor Report erroneously concludes, based on this passage, that the generation of reduced size images is merely a selective option that may be invoked. However, considering the '121 patent as a whole, it would be apparent to one skilled in the art at the time that the effect of this passage is to disclose that the invention is optionally capable of adding reduced size images to the full size ones on the disk store, in the event that, *e.g.*, the disk store was created on a system not having automatic generation. Claim 6, not at issue in this case, specifically addresses this optional mode of operation.

77. I agree that a person of ordinary skill in the art would understand the phrase "selectively generating" in claim 7 as stated in Ampex's Claim Construction at Construction 24.

I declare under penalty of perjury that the foregoing is true and correct. Executed this 22nd day of May, 2006, at Bedford, New York.

Alan Cavallerano

Alan Cavallerano

CERTIFICATE OF SERVICE

I, Julia Heaney, hereby certify that on May 23, 2006, I caused to be electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to the following:

Paul M. Lukoff, Esquire
David E. Brand, Esquire
Prickett, Jones & Elliott, P.A.

and that I caused copies to be served upon the following in the manner indicated:

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